Guam Remote Ground Terminal Customer Kickoff Meeting

July 1, 1997

Tom Gitlin/530.4

Agenda

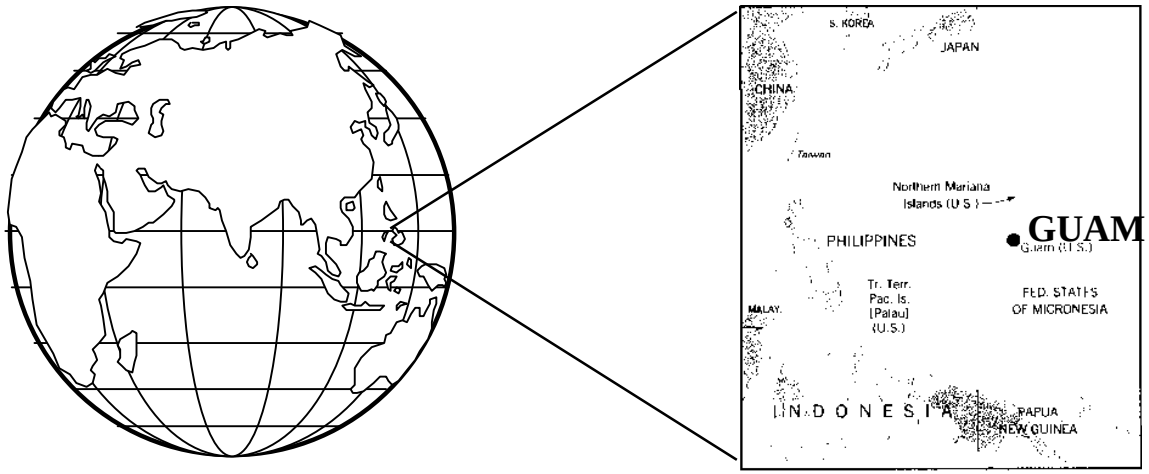
- Introduction
- GRGT Support Limitations
- TDRS Constellation
- Network Test Planning
- Network Test Structure
- Network Test Management
- Network Test Participants
- Test Configuration
- Network Test Process
- Related Documentation
- Schedule Highlights
- Issues and Concerns
- Summary

Introduction

- The NASA Space Operations Council approved the plan to establish a Tracking and Data Relay Satellite System (TDRSS) terminal at Guam
- The Guam Remote Ground Terminal (GRGT) will replace the GRO Remote Terminal System (GRTS) located in Canberra, Australia
  - The GRGT will provide significant expanded service capabilities as compared to GRTS
- The GRGT is operated only from the Cacique TDRSS Operations Control Center (TOCC)

Introduction (cont'd)

- The GRGT is located at the Naval Computer and Telecommunications Master Station (NCTAMS) facility in the US Territory of Guam
- The GRGT implementation is managed by the White Sands Complex (WSC) Project Office, Code 530.4
- The GRGT is scheduled to be operational in July 1998



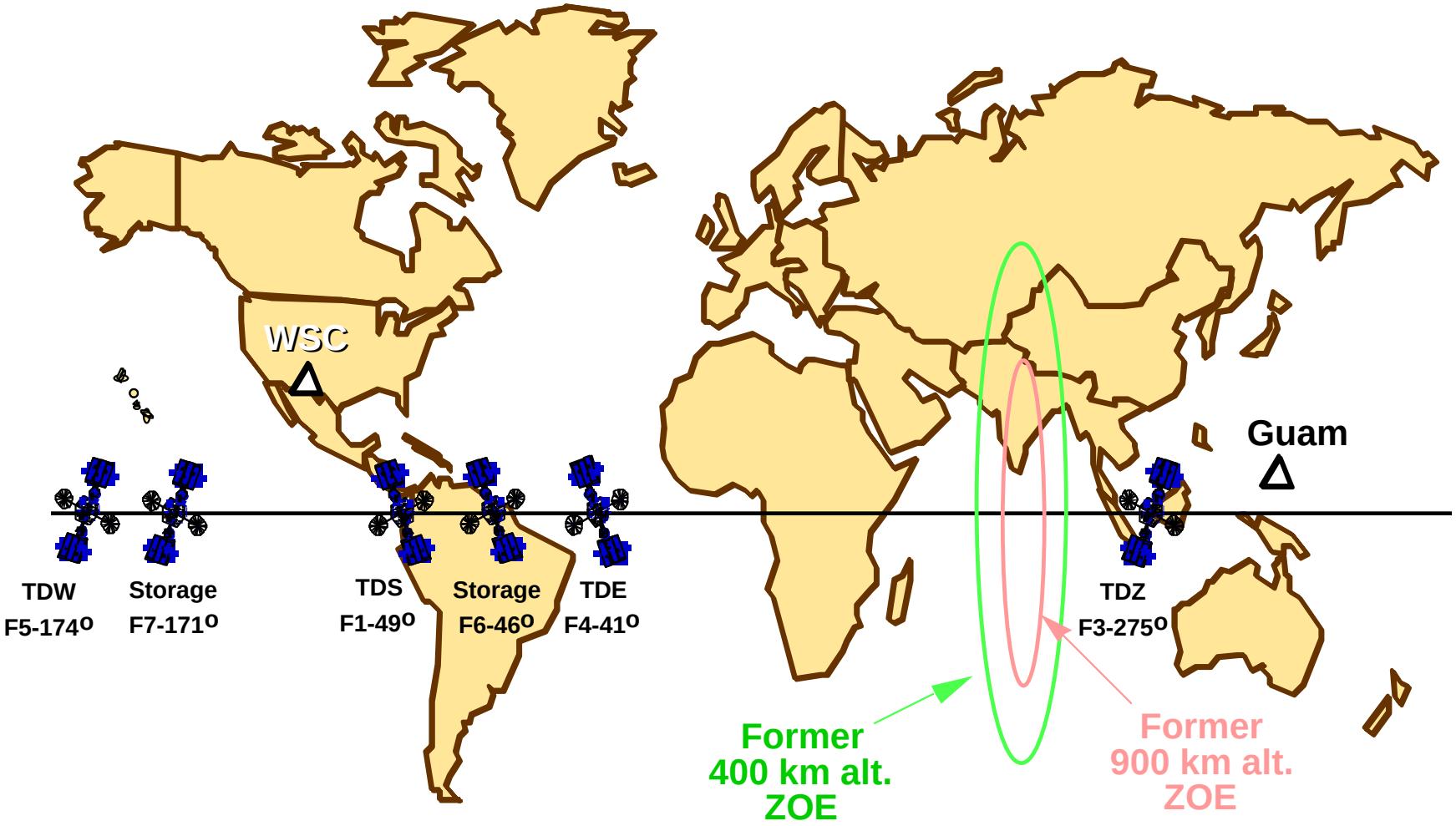
Introduction (cont'd)

- The GRGT will be established by relocating the Space to Ground Link Terminal-6 (SGLT-6) equipment from Cacique (WSGT) and the Multiple Access (MA) equipment from Canberra, Australia to Guam
  - A new 11 meter antenna for TDRS communications will be installed at Guam
  - A 4.5 meter antenna for End-to-End Testing (EET) will be relocated with SGLT-6
- The GRGT will effectively be an extension of Cacique, connected via commercial communication services
- The GRGT provides SA, MA and tracking services
  - Data rates are constrained by bandwidth to and from Guam (current plan is to provide 1.4 Mb of bandwidth for customer data)

GRGT Support Limitations

- No Return Data Delay (RDD) provided
- No local line outage recording
- Only 2 (vs. 5) MA return links
- No Project Operations Control Center (POCC) / Data Interface System (DIS) mode EET
- Operational bandwidth is limited (see earlier chart)
- Limited Shuttle local-mode EET data generation (no K-band Ch 1)
- Aggregate multiplexer (mux) output off site limited to 88 Mbps (even if operations bandwidth is increased)

TDRS Constellation



Network Test Planning

- The GRGT Performance Verification Plan (PVP) outlines a structured program for GRGT Testing
- The Network Test Plan (NTP) is the governing document for main network testing requirements
- The objectives for the Network tests are to verify the following:
  - The capability of the GRGT Telemetry, Tracking and Command (TT&C) equipment to provide operational support to a TDRS
  - The capability to provide K-band Single Access (KSA), S-Band Single Access (SSA) and S-Band MA services to the customers
  - Proper operation with the NCC, FDF, NISN, and other SN elements

Network Test Structure

- Network testing with customers will be performed at both Cacique and Guam
  - ***Cacique SN Confidence Tests-*** Initial interface testing with SN elements and customers in the Cacique test-bed before equipment shipment to Guam
  - ***GRGT Customer/Network Acceptance Tests-*** Performed with SN elements and customers following installation of all equipment in Guam in an operational configuration
  - ***GRGT Post-Acceptance Testing-*** Performed to test functions and capabilities not fully tested/required during earlier test phases
- Customer support capabilities will be verified by successful execution of predefined modules
- SN element requirements will be verified when the objectives defined in the NTP are successfully met

Network Test Management

- Integration and Test Manger (ITM), Tom Gitlin- Code 530.4
  - Responsible for the completion of all GRGT testing
- Space Services Director (SSD), Dinah Daughtridge- Code 532.2
  - Responsible to the WSC Project Office for the Cacique SN Confidence and Customer/Network Acceptance Testing Program
  - Responsible for developing and executing the Post-Acceptance Testing Program
- STDN Mission Manager (SMM), Jim Golden- ATSC
  - Responsible to the SSD for the technical coordination of all network tests
- Goddard Test Director (GTD), Don Morgan- ATSC
  - Responsible to the SSD for the execution of all network tests

Network Test Participants

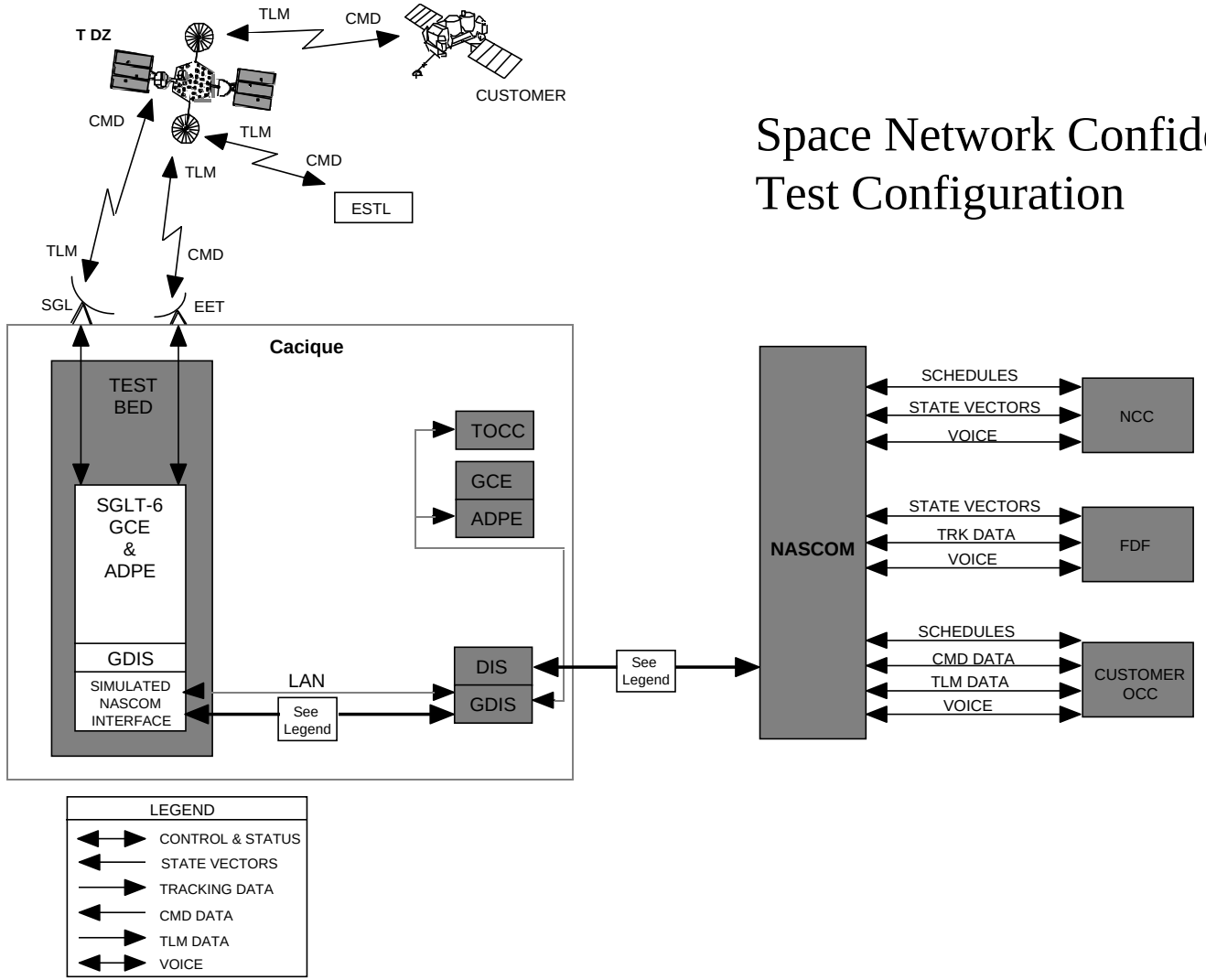
Customers

- Bilateral Ranging Transponder (BRTS)
- Compton Gamma Ray Observatory (CGRO)
- Extreme UltraViolet Explorer (EUVE)
- Hubble Space Telescope (HST)
- International Space Station (ISS)
- Land Remote Sensing Satellite 5 (LandSat 5)
- Land Remote Sensing Satellite 7 (LandSat 7)
- Long Duration Balloon Program (LDBP)
- Rossi X-ray Timing Explorer (RXTE)
- Space Shuttle Program (STS)

Elements

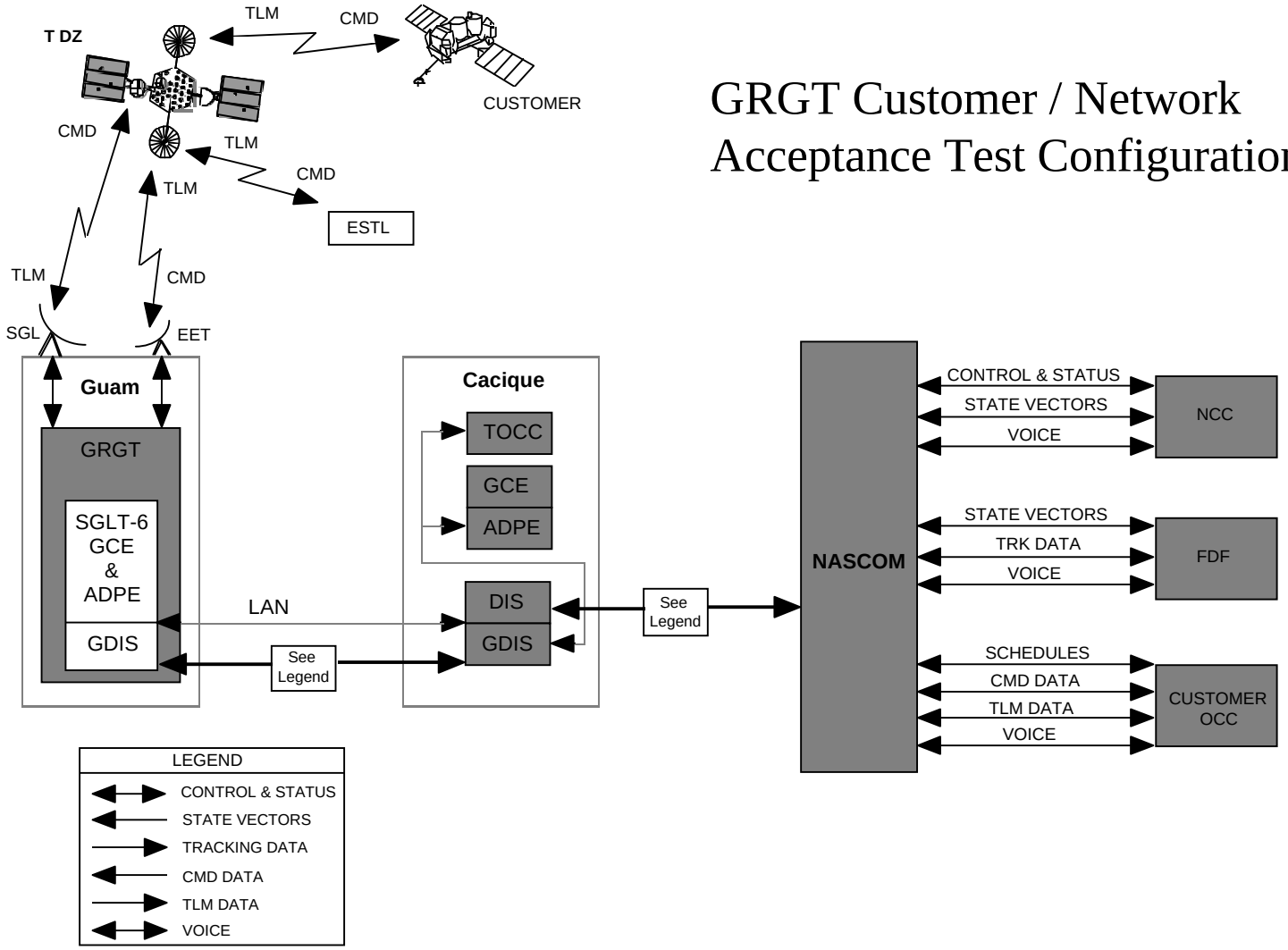
- Cacique
- Network Control Center (NCC)
- Flight Dynamics Facility (FDF)
- NASA Integrated Services Network (NISN)
- JSC Mission Control Center (MCC)
- Electronics System Test Laboratory (ESTL)
- Marshall Space Flight Center (MSFC)
- Sensor Data Processing Facility (SDPF)

Test Configuration



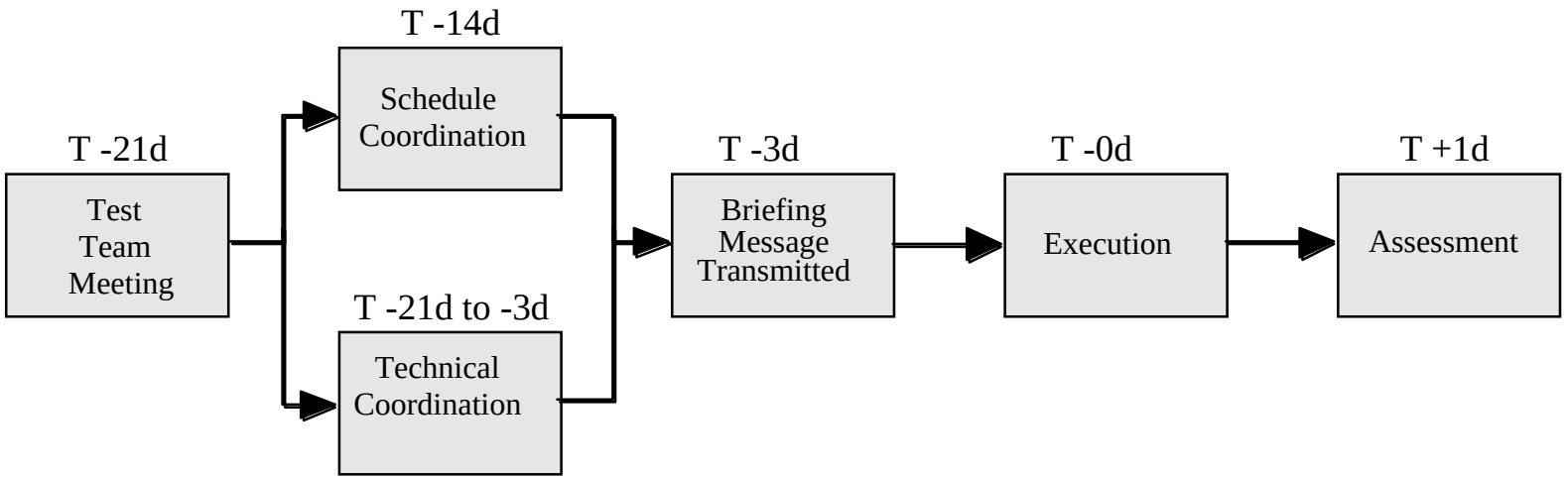
Space Network Confidence Test Configuration

Test Configuration (cont'd)



GRGT Customer / Network
Acceptance Test Configuration

Network Test Process



Time in Days (d)

Related Documentation

- GRGT Project Management Plan
  - Provides information on the project's management structure, resources and budget
- GRGT Performance Verification Matrix
  - Dynamic document that lists and tracks all test requirements which need to be completed on the project

Schedule Highlights

- Publish Network Test Plan - September 97
- Team Meeting - Mid November 97
- SN Confidence Testing (at Cacique)* - Mid December 97
- Customer/Network Acceptance Testing (at Guam)* - June 98
- F-3 Handover from GRTS to GRGT - Mid June 98
- Post-Acceptance Testing* - Mid June 98
- ORR - Mid July 98
- GRTS Decommission - December 98 (F-3 Handover + 6 months)

* These tests require customer participation

Issues and Concerns

- Initial operations bandwidth will not permit off-site transmission of Shuttle video
- GRGT TDRS and customer tracking accuracy being analyzed by FDF

Summary

- Review and comment on NTP by 7/17/97. Comments should be submitted to Don Morgan (e-mail preferred) at (don.morgan@gsfc.nasa.gov)
- Follow-up meeting in November to finalize testing activities
- Testing documentation can be found at:
  - http://tip.gsfc.nasa.gov/
  - http://wscproj.gsfc.nasa.gov/wscserv.htm